

LAKE HURON.

Stations.	Navigation.		Ice first formed.	Greatest thickness.	Ice disappeared.	Remarks.
	Closed.	Opened.				
Mackinac Island, Mich.....	Dec. 13, 1908	1909. Apr. 14	Dec. 27, 1908	14.0	Apr. 28	Navigation between the island and mainland did not close until February 11, 1909 and the mail steamer reached the dock from St. Ignace on April 2, 1909. Four steamers reported stuck in the ice between Sweets Point and Lime Island. The ice in St. Marys River forced April 20, 1909. Fish tugs operated until January 3, 1909. Harbor free of ice on April 6, 1909 and no ice south of the light-house. Harbor full of broken ice and many ice fields, drifting with the wind, off this port during March 1909. Ice fields not as extensive as former winters and the ice was not so thick. A few floating pieces of ice visible April 13, 1909, in the lake. Very little ice has formed around this island as compared with former years. Fish tugs began setting their nets March 11, 1909. Thunder Bay clear of ice March 23, 1909. Only few fields of ice observed off this port during the past winter and they have not been of sufficient thickness to obstruct the movements of fish tugs. Ice formed over the bay during the early part of the winter but was broken up and driven out by northeast gale on January 29, 1909. Saginaw River clear of ice March 30, 1909. Tug <i>Arthur Jones</i> cleared for Buffalo on April 18, 1909. Ice field did not exceed 3 miles in width during the past winter. But few fields of ice visible off this port as compared with former years. A large field of ice was observed at the mouth of the lake March 23, 1909 but most of it was blown back up the lake and did not pass down the river.
Detour, Mich. ....	Dec. 20, 1908	Apr. 19	Dec. 16, 1908	10.0		
Cheboygan, Mich.....	Dec. 23, 1908	Apr. 14	Jan. 12, 1909	5.0	Apr. 13	
Presque Isle, Mich.....	Dec. 15, 1908	Apr. 14	Dec. 1, 1908	29.0	Apr. 10	
Middle Island, Mich.....	Dec. 15, 1908	Apr. 14	Dec. 2, 1908	5.0	Mar. 30	
Thunder Bay Island, Mich. .	Dec. 13, 1908	Apr. 14	Dec. 2, 1908	6.0	Mar. 23	
Alpena, Mich.....	Dec. 8, 1908	Mar. 28	Dec. 12, 1908	12.0	Mar. 23	
Oscoda, Mich.....	Nov. 28, 1908					
Tawas Point L. S. S., (East Tawas), Mich. ....	Dec. 12, 1908		Nov. 15, 1908	13.0	Apr. 13	
Bay City, Mich.....	Dec. 5, 1908	Apr. 13	Dec. 3, 1908	12.0	Apr. 6	
Point aux Barques, Mich.....	Dec. 9, 1908		Jan. 6, 1909	10.0	Apr. 6	
Harbor Beach, Mich.....	Nov. 20, 1908		Dec. -, 1908	8.0	Mar. 30	
Port Huron, Mich.....	Dec. 16, 1908	Mar. 29	Dec. 5, 1908	10.5 <sup>a</sup>	Mar. 26	

<sup>a</sup> Measured in Black River.

DETROIT RIVER.

Detroit, Mich.....	Dec. 14, 1908	Mar. 29	Dec. 8, 1908	8.0	Mar. 23	The ice in Lake St. Clair was broken up by warm wave January 25, 1909. Heavy snow and some slush ice retarded the ferries somewhat on February 16 and 17, 1909. On March 7 the steamer <i>Pleasure</i> made a trip to Bois Blanc and reported no ice encountered. A channel from Lake St. Clair to Lake Erie was open on March 15, 1909. Navigation was opened by the steamer <i>City of Detroit</i> on March 29, to Cleveland, and the steamer <i>W. J. Carter</i> passed down same day.
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LAKE ERIE.

Toledo, Ohio.....	Dec. 14, 1908		Dec. 9, 1908	5.5	Mar. 9	Maumee River cleared of ice February 24, 1909; very little ice in Maumee Bay after this date. The ice around the islands was broken up on March 16 and a steamer could have easily reached the landings by March 23, 1909. Ice fields off this port were not as heavy as usual. Sandusky Bay was clear of ice on March 8, 1909. Harbor practically clear of ice March 2, and no ice observed in the lake after March 16, 1909. No ice in the lake off this port after March 16, 1909. No ice in the lake off this port after March 23, 1909. This port was practically open for navigation except for two weeks in the latter part of March when northerly winds drove a heavy field into the harbor. Fishing tugs were operating with very little difficulty on March 30, 1909. A large ice field driven in by the wind, prevailed off this port for about two weeks during the latter part of March. The ice fields off this port were not as extensive nor as thick as usual. Navigation closed by departure of the steamer <i>Davidson</i> on December 23, 1908. There was no ice in the harbor after April 9. The ice in this end of the lake was broken up by the gale of April 7 and gradually passed down the river until April 26, 1909.
Put-in-Bay, Ohio.....	Jan. 1, 1909	Mar. 23	Jan. 15, 1909	6.0	Mar. 27	
Kelleys Island, Ohio.....	Dec. 31, 1908	Mar. 10	Dec. 20, 1908	8.0	Mar. 27	
Marblehead, Ohio.....	Dec. 15, 1908	Mar. 10	Jan. 1, 1909?	4.0	Mar. 23	
Sandusky, Ohio.....	Dec. 28, 1908	Mar. 10	Dec. 8, 1908	5.0	Mar. 23	
Huron, Ohio.....	Dec. 11, 1908		Dec. 10, 1908	5.0	Mar. 16	
Lorain, Ohio.....	Dec. 10, 1908		Jan. 12, 1909	3.0	Mar. 9	
Cleveland, Ohio.....	Dec. 11, 1908	Mar. 29	Jan. 2, 1909	4.0	Mar. 26	
Ashtabula, Harbor, Ohio.....	Jan. - 1909	Mar. 30		7.0	Mar. 30	
Conneaut Harbor, Ohio.....	Feb. 5, 1909	Mar. 8	Jan. 1, 1909		Apr. 2	
Erie, Pa. ....	Dec. 19, 1908	Apr. 1	Nov. 4, 1908	4.5	Apr. 6	
Dunkirk, N. Y.....	Dec. 31, 1908		Dec. 23, 1908	4.5	Apr. 13	
Buffalo, N. Y.....	Dec. 28, 1908	Apr. 16	Dec. 23, 1908	6.0	Apr. 26	

LAKE ONTARIO.

Fort Niagara, N. Y.....	Dec. 6, 1908		Dec. 23, 1908	6.0	Apr. 27	No ice in this vicinity on March 30, but considerable came down the Niagara River after this date and the river was blocked on April 13, 1909. All ice cleared from the harbor on the afternoon of March 25 and none visible in the lake after March 9, 1909. Some ice remained in the coves, but there was no ice visible in the lake after March 2, 1909. There has been practically no ice in the lake during the winter; the steamer <i>Hinckley</i> was setting buoys on April 6; and the steamer <i>Cornelia</i> arrived from Kingston on April 10, 1909. Black River and the harbor began breaking up on April 6, 1909. The gale of April 7 cleared the harbor of ice and the steamer <i>Pierrepoint</i> arrived from Kingston on that date. The river free of ice below the light-house on March 2, but above it remained solid until late in March.
Charlotte, N. Y.....	Dec. 3, 1908	(Mar. 9?)	Jan. 7, 1909	4.0	Mar. 9	
Sodus Point, N. Y.....	Dec. 9, 1908	Mar. 25	Dec. 9, 1908	12.0	Mar. 25	
North Fair Haven, N.Y.....	Dec. 6, 1908	Mar. 26	Dec. 10, 1908	11.0	Apr. 6	
Oswego, N. Y.....	Dec. 7, 1908	Apr. 19	Dec. 6, 1908	8.0	Mar. 11	
Sacketts Harbor, N. Y.....	Dec. 20, 1908		Jan. 2, 1909	9.0	Apr. 13	
Cape Vincent, N. Y.....	Jan. 8, 1909	Apr. 7	Dec. 25, 1908	12.0	Apr. 13	
Ogdensburg, N. Y.....	Dec. 20, 1908		Dec. 15, 1908	16.0	Mar. 30	

RECENT PAPERS BEARING ON METEOROLOGY AND SEISMOLOGY.

C. FITZHUGH TALMAN, Librarian.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a —

*American aeronaut.* New York. August, 1909.  
 Clayton, Henry Helm. The uses of sea breezes in balloon sport. p. 26-28.  
*American geographical society. Bulletin.* New York. v. 41. August, 1909.  
 Ward, R. DeC. Effect of atmospheric pressure upon the earth's surface. p. 505-506. [Abstract of paper by Denison.]

*Astronomical observatory of Harvard college. Annals.* Cambridge. v. 56, pt. 3. 1908.  
 Clayton, H. Helm. The meteorology of total solar eclipses, including the eclipse of 1905. p. 192-216.  
 Rotch, A. Lawrence. The eclipse shadow bands. p. 217-222.  
*Astrophysical journal.* Chicago. v. 30. July, 1909.  
 Humphreys, W. J. The radiation exponent of dry air. p. 20-25.  
*Geographical journal.* London. v. 34. August, 1909.  
 Martin, Edward J. Some observations on dew-points. p. 174-195.  
 — The snow-line in Norway. p. 210. [Abstract of paper by Rekstad.]  
 — Climatic change in Egypt. p. 212. [Abstract of paper by Keelling.]  
 — The "Ornithias" of the Greeks. p. 218.  
 — Marsh vegetation and evaporation. p. 219. [Extract of paper by Yapp.]  
*Geographical society of Philadelphia. Bulletin.* Philadelphia. v. 7. July, 1909.  
 Ward, R. DeC. An outline of the economic climatology of Brazil. p. 13-22.  
*Indian meteorological department. Memoirs.* Simla. v. 20, pt. 3. 1909.  
 Patterson, R. J. The Simla seismograms obtained between June, 1905, and November, 1908. p. 33-52.

- Nature*. London. v. 51. 1909.  
— The International commission for scientific aeronautics. p. 353-356. (May 20.)
- Cleland, R. Burton.** Barisal guns in Australia. p. 127. (July 29.)
- Royal astronomical society of Canada. Journal.* Toronto. v. 3. May-June, 1909.
- Stupart, R. F.** Atmospheric circulation. p. 220-223.
- Royal institution of Great Britain.* London. v. 18, pt. 3. 1906-1907.
- Chrystal, George.** Seiches in the lakes of Scotland. p. 657-676.
- Royal meteorological society. Quarterly journal.* London. v. 35. July, 1909.
- Cornish, Vaughan.** Wind-waves in water, sand, snow, and cloud. p. 149-160.
- Latham, Baldwin.** Percolation, evaporation, and condensation. p. 189-211.
- Algué, José.** The meteorological conditions in the Philippine Islands, 1908. p. 213-219.
- Royal society of Edinburgh. Transactions.* Edinburgh. v. 46, pt. 3. 1908-9.
- Chrystal, G., & Murray, James.** An investigation of the seiches of Loch Earn by the Scottish lake survey. p. 455-518.
- Science.* New York. v. 30. July 9, 1909.
- Palmer, Andrew H.** A remarkable aurora borealis. p. 57-58.
- Scientific American supplement.* New York. v. 43. July 24, 1909.
- Reid, E. Emmet.** A convenient form of air thermometer. p. 59.
- Terrestrial magnetism and atmospheric electricity.* Baltimore. v. 14. June, 1909.
- Biographical sketch of Dr. Birkeland. p. 84. [With portrait.]
- Humphreys, W. J.** Birkeland's theory of magnetic storms and terrestrial magnetism. p. 81-83.
- Aérophile.* Paris. 17 année. 15 juillet 1909.
- Oléry, A.** Capitaine Hildebrandt. p. 313. [With portrait.]
- Annales de géographie.* Paris. 18 année. 15 juillet 1909.
- L'étude de la haute atmosphère. p. 371-373. [Résumé of recent researches, mainly in 1908.]
- Archives des sciences physiques et naturelles.* Genève. Tome 28. 15 juillet 1909.
- Mercanton, Paul L.** Rapport sur l'enneigement des Alpes suisses en 1908. p. 78-79.
- Forel, A.** Taux d'accroissement du tapis de neige avec l'altitude. p. 79-80.
- Ciel et terre.* Bruxelles. 30 année. 16 juillet 1909.
- L., V. D.** Le froid de juin dernier. p. 250.
- France. Académie des sciences. Comptes rendus.* Paris. Tome 149. 5 juillet 1909.
- Beauchamp.** Sur un essai de défense contre la grêle. p. 149. [Extract.]
- Géographie.* Paris. Tome 19. 15 juin 1909.
- Lemoine, Paul.** Les tremblements de terre en Provence. p. 441-443.
- Nature.* Paris. 17 année. 1909.
- Loisel, J.** Les grains et les orages. p. 105-108.
- Fournier, Lucien.** L'Institut aérodynamique de Koutchino. p. 133-141. [31 juillet.] [Illustrated.]
- Société belge d'astronomie. Bulletin.* Bruxelles. 14 année. Juin 1909.
- Nodon, A.** L'activité solaire et les phénomènes terrestres. p. 224-227.
- Alippi, T.** Sur une relation entre la variation diurne de la pression et les indications barométriques initiales des cyclones et des anticyclones. p. 243-248.
- Annalen der Physik.* Leipzig. Band 29. 1909.
- Bahr, Eva von.** Ueber die Einwirkung des Druckes auf die Absorption ultrarother Strahlung durch Gase. p. 780-796.
- Beiträge zur Physik der freien Atmosphäre.* Leipzig. Band 3. 1909.
- Remp, G.** Bericht über die 6. Konferenz der Internationalen Kommission für wissenschaftliche Luftschiffahrt zu Monaco. p. 1-7.
- Illustrierte aeronautische Mitteilungen.* Strassburg. 13. Jahrgang. 28 Juli 1909.
- Elias, H.** Aerologie und Luftschiffahrt. p. 629-632.
- Kassner, O.** Die Anfänge der Aerologie. p. 632-634. [Brief history of aerological research from 1749 to 1885].
- Schreiber, Paul.** Beiträge zur Theorie der Pilotaufstiege. p. 635-651.
- Wegener, Alfred.** Die Drachen- und Fesselballonaufstiege der Dänemark-Expedition. p. 652-656. [Illustrated.]
- Kleinschmidt, E.** Die Verwendung des Fesselballons auf der Drachenstation am Bodenese. p. 656-664. [Illustrated.]
- Polis, P[eter].** Die aerologischen Einrichtungen des meteorologischen Observatoriums zu Aachen. p. 664-665.
- Polis, P[eter].** Bedeutung und Verwertung der Meteorologie für die Luftschiffahrt unter besonderer Berücksichtigung der letzten Wettfahrten in Rheinland und Westfalen. p. 665-673. [Illustrated.]
- Meteorologische Zeitschrift.* Braunschweig. Band 26. Juli 1909.
- Hann, J[ulius].** Die meteorologischen Ergebnisse der englischen antarktischen Expedition 1901 bis 1904. p. 289-301.
- Daunderer, A.** Ueber die in den unteren Schichten der Atmosphäre vorhandene freie elektrische Raumladung. p. 301-311.
- Ficker, H. von.** Der Einfluss orographischer Verhältnisse auf die Niederschläge in Tirol und Vorarlberg. p. 311-315.
- Maurer, J.** Ueber die Veränderlichkeit der Lufttemperatur für das Schweizergebiet. p. 315-318.
- Gold, Ernest, & Schmidt, Wilhelm.** Bemerkungen über die Eichung der ballon-sonde-Apparate bei tiefen Temperaturen. p. 318-321.
- Grosse, —.** Professor Dr. Paul Bergholz. p. 321-322.
- Regenfall zu Asuncion in Paraguay zwischen 1877 und 1902. p. 322.
- MacDowall, Alex. B.** Vorausbestimmung des Sommerregensfalls. p. 323.
- H[ann], J[ulius].** Klima von Jersey (Kanalinselfn). p. 323-324.
- Resultate der meteorologischen Beobachtungen zu Christmas Island im Jahre 1907. p. 324.
- Sato, T.** Ergebnisse der Verdunstungsbeobachtungen auf dem Tsukubasan im Jahre 1902. p. 324-325.
- Schürmann, Heinr.** Zur Meteorologie der Kohlengrube. Unerkannte Probleme. p. 326-327.
- Hann, J[ulius].** Resultate der meteorologischen Beobachtungen zu Zomba, Südafrika, Shire-Hochland, in den Jahren 1892 bis 1907. p. 327.
- Schmidt, Rudolf.** Johannes Schön. Zu seinem 70. Todestag. (18. April). p. 328.
- Toynbee, Capt. Henry. p. 328.
- Stützer, —.** Vergleichende Temperaturmessungen zu Marburg a. d. L. p. 329-331.
- Petermanns Mitteilungen.* Gotha. 55. Band. 1909.
- Voiekov, A[lexander].** Der Aralsee und sein Gebiet nach den neuesten Forschungen. p. 82-86.
- Fitzner, Rud.** Die Regenverhältnisse der Togogebiets. p. 93-94.
- Mecking, Ludwig.** Zum antarktischen Klima. p. 113-116.
- Gerbing, W.** Das Klima von Siam und die Ergebnisse der von Dr. Hosseus angestellten meteorologischen Beobachtungen. p. 128-133.
- Prometheus.* Berlin. 21 Juli 1909.
- O., —.** Ein elektrisches Barometer. p. 669-670.
- Wetter.* Berlin. 26. Jahrgang. 1909.
- Schwalbe, Gustav.** Die Gesetze der allgemeinen Temperaturverteilung auf der Erdoberfläche. p. 121-126. [Juni 1909.]
- Eidler, Eduard Schiefer.** Ueber Wintergewitter. p. 127-132. [Juni 1909.]
- Ellemann, Fr.** Ueber die meteorologische und kulturhistorische Bedeutung der Wetter- und Bauernregeln. p. 145-157.
- Nuovo cimento.* Pisa. Anno 55. May-June 1909.
- Amaduzzi, Lavoro.** Pressione e conductibilità elettrica dell'atmosfera. p. 356-360.
- Società aeronautica Italiana. Bollettino.* Roma. Anno 8. Giugno 1909.
- Pacini, D.** Sulla radiazioni penetranti presenti nell'atmosfera. p. 197-204.

#### RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

C. FITZHUGH TALMAN, Librarian.

The following have been selected from among the titles of books recently received, as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies. Most of them can be lent for a limited time to officials and employees who make application for them. Anonymous publications are indicated by a —.

**Austria.** K. k. Zentralanstalt für Meteorologie und Geophysik. Jahrbücher ... Jahrg. 1907. Neue Folge. 44. Bd. Wien. 1909. v. p. f<sup>o</sup>.

**Bartlett, James L.** The cold waves of south-central Wisconsin. (In Transactions of the Wisconsin academy of sciences, arts, and letters. v. 16, pt. 1, no. 3. Madison. 1908.)

**Battiscombe, C. A.** ... The influence of rainfall on the design of sewers. London. 1909. p. 93-119. 8<sup>o</sup>. (Read at the Royal United service institution, May 3, 1909.)

**Bavaria.** K. Bayerische meteorologische Centralstation. Deutsches meteorologisches Jahrbuch. 1904. München. 1909. v. p. f<sup>o</sup>.

Same. 1905. München. 1909. v. p. f<sup>o</sup>.

Same. 1906. München. 1909. v. p. f<sup>o</sup>.

Same. 1907. München. 1909. v. p. f<sup>o</sup>.

... Die von der K. b. meteorologischen Centralstation im Jahre 1906-1908 veranstalteten Registrierballonfahrten von August Schmauss. München. 1907-1909. f<sup>o</sup>. (Sonderabdruck aus den "Beobachtungen der meteorologischen Stationen im Königreich Bayern," hrsg. von der K. met. Centralstation ... Bd. 28-30, 1906-1908.